

## MEDICAL GUIDELINES, INCLUDING INFECTION CONTROL

May 1, 2003

Utah Public Health

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### CASE DEFINITION (04/30/03):

The previous CDC SARS case definition (published April 20, 2003) has been updated as follows:

[Laboratory criteria](#) for evidence of infection with the SARS-associated coronavirus (SARS-CoV) have been added.

[Clinical criteria](#) have been revised to reflect the possible spectrum of respiratory illness associated with SARS-CoV.

[Epidemiologic criteria](#) have been retained. Taiwan has been added to the areas with current documented or suspected community transmission of SARS; Hanoi, Vietnam is now an area with recently documented or suspected community transmission of SARS.

#### Clinical Criteria

- Asymptomatic or mild respiratory illness
- Moderate respiratory illness  
Temperature of  $>100.4^{\circ}\text{F}$  ( $>38^{\circ}\text{C}$ )\*, **AND**  
One or more clinical findings of respiratory illness (e.g., cough, shortness of breath, difficulty breathing, or hypoxia).
- Severe respiratory illness  
Temperature of  $>100.4^{\circ}\text{F}$  ( $>38^{\circ}\text{C}$ )\*, **AND**  
One or more clinical findings of respiratory illness (e.g., cough, shortness of breath, difficulty breathing, or hypoxia), **AND**

radiographic evidence of pneumonia, **OR**  
respiratory distress syndrome, **OR**  
autopsy findings consistent with pneumonia or respiratory distress  
syndrome without an identifiable cause

#### **Epidemiologic Criteria**

Travel (including transit in an airport) within 10 days of onset of symptoms to an area with current or recently documented or suspected community transmission of SARS†, **OR**

Close contact§ within 10 days of onset of symptoms with a person known or suspected to have SARS infection

#### **Laboratory Criteria¶**

##### Confirmed

Detection of antibody to SARS-CoV in specimens obtained during acute illness or >21 days after illness onset, or

Detection of SARS-CoV RNA by RT-PCR confirmed by a second PCR assay, by using a second aliquot of the specimen and a different set of PCR primers, or  
Isolation of SARS-CoV

##### Negative

Absence of antibody to SARS-CoV in convalescent serum obtained >21 days after symptom onset

Undetermined: laboratory testing either not performed or incomplete

#### **Case Classification\*\***

Probable case: meets the clinical criteria for severe respiratory illness of unknown etiology with onset since February 1, 2003, and epidemiologic criteria; laboratory criteria confirmed, negative, or undetermined

Suspect case: meets the clinical criteria for moderate respiratory illness of unknown etiology with onset since February 1, 2003, and epidemiologic criteria; laboratory criteria confirmed, negative, or undetermined

#### **Also see:**

[MMWR: Updated Interim Surveillance Case Definition for Severe Acute Respiratory Syndrome \(SARS\)— April 29, 2003](#)

\* A measured documented temperature of >100.4° F (>38° C) is preferred. However, clinical judgment should be used when evaluating patients for whom a measured temperature of >100.4° F (>38° C) has not been documented. Factors that might be considered include patient self-report of fever, use of antipyretics, presence of immunocompromising conditions or therapies, lack of access to health care, or inability to obtain a measured temperature. Reporting authorities might consider these factors when classifying patients who do not strictly meet the clinical criteria for this case definition.

† Areas with current documented or suspected community transmission of SARS include mainland China and Hong Kong Special Administrative Region, People's Republic of China; Singapore; Taiwan; and Toronto, Canada. Hanoi, Vietnam is an area with recently documented or suspected community transmission of SARS.

§ Close contact is defined as having cared for or lived with a person known to have SARS or having a high likelihood of direct contact with respiratory secretions and/or body fluids of a patient known to have SARS. Examples of close contact include kissing or embracing, sharing eating or drinking utensils, close conversation (<3 feet), physical examination, and any other direct physical contact between persons. Close contact does not include activities such as walking by a person or sitting across a waiting room or office for a brief period of time.

¶ Assays for the laboratory diagnosis of SARS-CoV infection include enzyme-linked immunosorbent assay, indirect fluorescent-antibody assay, and reverse transcription polymerase chain reaction (RT-PCR) assays of appropriately collected clinical specimens (Source: CDC. Guidelines for collection of specimens from potential cases of SARS. Available at [http://www.cdc.gov/ncidod/sars/specimen\\_collection\\_sars2.htm](http://www.cdc.gov/ncidod/sars/specimen_collection_sars2.htm)). Absence of SARS-CoV antibody from serum obtained ≤21 days after illness onset, a negative PCR test, or a negative viral culture does not

exclude coronavirus infection and is not considered a definitive laboratory result. In these instances, a convalescent serum specimen obtained >21 days after illness is needed to determine infection with SARS-CoV. All SARS diagnostic assays are under evaluation.

\*\* Asymptomatic SARS-CoV infection or clinical manifestations other than respiratory illness might be identified as more is learned about SARS-CoV infection.

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### **CLINICAL DESCRIPTION:**

As of March 21, 2003, the majority of patients identified as having SARS have been adults aged 25--70 years who were previously healthy. Few suspected cases of SARS have been reported among children aged  $\leq 15$  years.

The incubation period for SARS is typically 2--7 days; however, isolated reports have suggested an incubation period as long as 10 days.

**Prodrome** - The illness generally begins with a fever ( $>100.4^{\circ}\text{F}$  [ $>38.0^{\circ}\text{C}$ ]). Fever often is high, sometimes is associated with chills and rigors, and might be accompanied by other symptoms, including headache, malaise, and myalgia. At the onset of illness, some persons have mild respiratory symptoms. Typically, rash and neurologic or gastrointestinal findings are absent; however, some patients have reported diarrhea during the febrile prodrome.

**Clinical Presentation:** After 3--7 days, a lower respiratory phase begins with the onset of a dry, nonproductive cough or dyspnea, which might be accompanied by or progress to hypoxemia. In 10%--20% of cases, the respiratory illness is severe enough to require intubation and mechanical ventilation. The case-fatality rate among persons with illness meeting the current WHO case definition of SARS is approximately 3%.

### **Laboratory Tests (04/09/03):**

Obtain a measured temperature, chest X-ray, pulse oximetry, blood culture, sputum Gram stain and culture, as well as a culture for respiratory viral pathogens including Influenza A and B and RSV.

After discussions with public health, you may be advised to collect samples to assist in ruling out SARS. These samples would be nasopharyngeal or oropharyngeal swabs, blood (EDTA tube), serum (red or tiger topped tube), urine, and stool. You will be advised on transport of these specimens. These samples will be tested for the presence of the coronavirus (suspect cause of SARS) and/or the presence of antibody to this virus.

- Serum antibody tests, including both enzyme immunoassay (EIA) and indirect immunofluorescence antibody (IFA) formats, have been developed.
- Reverse transcription-polymerase chain reaction (RT-PCR) testing is also available. This test can detect coronavirus RNA in clinical specimens, including serum, stool, and nasal secretions.

- Viral isolation for the new coronavirus also has been done. In these studies, clinical specimens from SARS patients are co-cultured with well-characterized cell lines and then laboratorians look for evidence of coronavirus replication in these cultured cells.

### **Sample Collection (04/14/03):**

From CDC, 04/23/03, recommendations for acute and convalescent SARS specimens:

Acute:

- 2 NP swabs (one in viral transport and one in bacterial transport) if only 1 can be collected, put it into viral transport
- Urine (in clean container)
- Stool (in clean container – not with transport media)
- 1 red or tiger top tube of blood (5-10 mL)
- 1 purple top tube of blood

Convalescent: (21 or more days after onset)

- 1 red or tiger top tube of blood (5-10 mL)
- 1 purple top tube of blood

Respiratory specimens should be collected as soon as possible in the course of the illness. The likelihood of recovering most viruses diminishes markedly >72 hours after symptom onset. Some respiratory pathogens may be isolated after longer periods.

Three types of specimens may be collected for viral or bacterial isolation and PCR. These include: 1) nasopharyngeal wash/aspirates; 2) nasopharyngeal swabs; or 3) oropharyngeal swabs. Nasopharyngeal aspirates are the specimen of choice for detection of respiratory viruses and are the preferred collection method among children aged <2 years.

#### ***Nasopharyngeal wash/aspirate:***

Have the patient sit with the head tilted slightly backward. Instill 1 - 1.5 ml of nonbacteriostatic saline (pH 7.0) into one nostril. Flush a plastic catheter or tubing with 2 - 3 ml of saline. Insert the tubing into the nostril parallel to the palate. Aspirate nasopharyngeal secretions. Repeat this procedure for the other nostril. Collect 1-2 mL specimens in sterile vials. Each specimen should be labeled with ID number and the date collected. If shipped domestically, ship with cold packs to keep sample at 4°C.

#### ***Nasopharyngeal/oropharyngeal swabs:***

Use only sterile dacron or rayon swabs with plastic shafts. Do **NOT** use calcium alginate swabs or swabs with wooden sticks, as they may contain substances that inactivate some viruses and inhibit PCR testing.

- Nasopharyngeal swabs - Insert swab into nostril parallel to the palate and leave in place for a few seconds to absorb secretions. Swab both nostrils.

- Oropharyngeal swabs - Swab both posterior pharynx and tonsillar areas, avoiding the tongue.

Place swabs immediately into sterile vials containing 2 ml of viral transport media. Break applicator sticks off near the tip to permit tightening of the cap. Each specimen should be labeled with ID number and the date collected. If shipped domestically, ship with cold packs to keep sample at 4°C. If shipped internationally, ship on dry ice.

***Bronchoalveolar lavage (BAL), tracheal aspirate, or pleural tap:***

Collection of bronchoalveolar lavage, tracheal aspirate, pleural tap: If these specimens have been obtained, half should be centrifuged and the cell-pellet fixed in formalin. Remaining unspun fluid should be placed in sterile vials with external caps and internal O-ring seals. If there are no internal O-ring seals, then cap securely and seal with parafilm. Each specimen should be labeled with ID number and the date the sample was collected. If shipped domestically, ship with cold packs to keep sample at 4°C.

If the patient is intubated and it is clinically indicated, consider a transbronchial, fine needle or open lung biopsy. For domestic transportation, store and ship with cold packs to keep samples at 4°C.

***Blood:***

*Collection of serum:* Acute serum specimens should be collected and submitted as soon as possible. If the patient meets the case definition, convalescent specimens should be collected and submitted no sooner than 22 days after the onset of fever.

Collect 5-10 ml of whole blood in a serum separator tube. Allow blood to clot, centrifuge briefly and collect all resulting sera in vials with external caps and internal O-ring seals. If there are no internal O-ring seals, then cap securely and seal with parafilm. A minimum of 200 microliters of serum is preferred for each test which can easily be obtained from 5mL of whole blood.

*Pediatric patients:* a minimum of 1cc of whole blood is needed for testing. If possible, collect 1cc in both an EDTA and clotting tube. However, if only 1cc can be obtained, please use a clotting tube for collection.

Each specimen should be labeled with ID number and the date the specimen was collected. If unfrozen and transported domestically, ship with cold packs to keep sample at 4°C. If frozen or transported internationally, ship on dry ice.

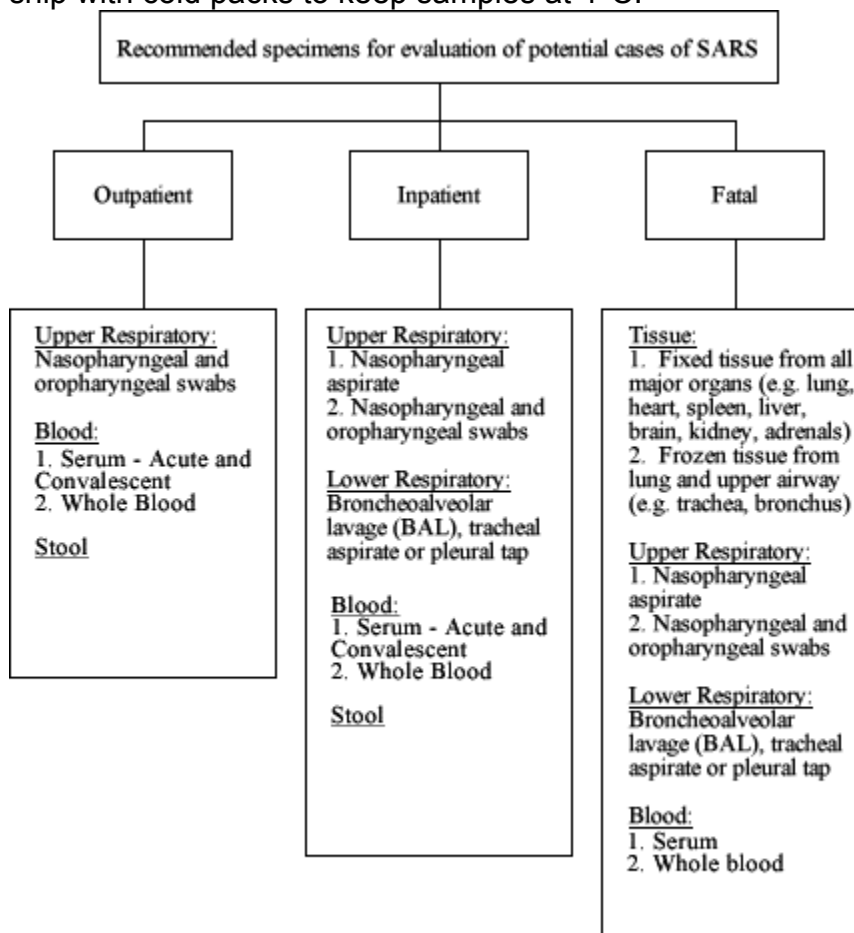
*Collection of EDTA blood:* Collect 5-10 ml of whole blood in an EDTA (purple-top) tube. Transfer to vials with external caps and internal O-ring seals. If there are no internal O-ring seals, then cap securely and seal with parafilm. Each specimen should be labeled with ID number and date of collection. If shipped domestically, blood specimens should be stored and shipped with cold packs to keep sample at 4°C. If shipped internationally, ship on dry ice.

Collect 5-10 ml of whole blood in serum separator tube. Allow blood to clot, centrifuge and aliquot resulting sera. Seal tightly using parafilm. If serum has already been frozen, ship on dry ice. If unfrozen, ship with cold packs to keep samples at 4°C.

**Fixed tissue:** Formalin fixed or paraffin embedded tissue from all major organs (e.g. lung, trachea, heart, spleen, liver, brain, kidney, adrenals). Store and ship at room temperature. **\*DO NOT FREEZE FIXED TISSUES\***

**Frozen tissue:** Fresh frozen tissues from lung and upper airway (e.g. trachea, bronchus). Specimens should be collected aseptically via biopsy or at autopsy performed as soon as possible after death. Place each specimen in separate sterile containers containing small amounts of viral transport media or saline. Store and ship on dry ice.

**Stool:** Stool (10-50 cc) should be placed in a stool cup or urine container, securely capped, sealed with parafilm and bagged. For domestic transportation, ship with cold packs to keep samples at 4°C.



**Laboratory Results:**

***Radiographic:*** Initial radiographic findings are not distinguishable from those associated with other causes of bronchopneumonia, including focal infiltrates that can progress to multifocal or widespread consolidation and/or a pattern of ARDS

***Chemistry:*** Patients may have leukopenia and thrombocytopenia, along with elevated creatine phosphokinase and hepatic transaminases.

***Microbiology (04/09/03):***

A positive test result means that the patient with SARS also has or recently had an infection with the new coronavirus, which ***might*** have been the cause of SARS in this patient.

At this time, a negative test result does not exclude the possibility of the patient having SARS. CDC still considers individuals to be SARS patients on the basis of symptoms and exposures, not on laboratory test results. This interpretation may change as the tests improve. There are several possibilities to explain negative test results in a patient with SARS:

1. The patient did not have an infection with this new coronavirus. SARS or illnesses like SARS may also be caused by other viruses or infectious agents. It can sometimes be difficult to find out which germ (virus, bacteria, etc.) is causing a person to be ill with fever, respiratory symptoms, and pneumonia. For example, only about half of the cases of pneumonia that are diagnosed have a specific etiologic agent detected. Also, SARS and illnesses like SARS might be caused by something other than this new coronavirus.
2. The tests may be incorrect ("false-negative"). As the tests are improved, CDC may re-test specimens from SARS patients with negative test results. Results from more sensitive, improved tests might be positive.
3. The samples were not obtained at a time point in the course of coronavirus infection when test results are positive. The RT-PCR test will only be positive if there is viral RNA in the specimen. This may be for a fairly brief period, depending on which specimen (e.g., serum, stool, nasal secretions) was tested. The antibody tests may not become positive until more than 21 days after illness onset.

**Treatment:** Symptomatic treatment, including coverage for community-acquired pneumonias.

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**PATIENT TRIAGE (04/11/03):**

To facilitate identification of patients who may have SARS in ambulatory care settings, targeted screening questions concerning fever, respiratory symptoms, close contact with a SARS suspect case patient, and recent travel should be included at triage or as soon as possible after patient arrival. The most recent case definition for SARS should be used as the basis for questions regarding travel history.

Health-care personnel who are the first points of contact should be trained to perform SARS screening. In the absence of a systematic screening or triage system, providers taking care of patients in ambulatory care settings should perform such screening before performing other history-taking or examinations. Because patients with developing SARS may present with either only fever or only respiratory symptoms, infection control precautions should be instituted immediately for patients who have either fever or respiratory symptoms and have had close contact with SARS or who have a history of international travel to an area identified by the case definition. A surgical mask should be placed on such patients early during the triage process until other recommended infection control precautions can be instituted including:

- Standard precautions (e.g., hand hygiene); in addition to routine standard precautions, health-care personnel should wear eye protection for all patient contact.
- Contact precautions (e.g., use of gown and gloves for contact with the patient or their environment)
- Airborne precautions (e.g., an isolation room with negative pressure relative to the surrounding area and use of an N-95 filtering disposable respirator for persons entering the room). Where respirators are not available, healthcare personnel evaluating and caring for suspect SARS patients should wear a surgical mask.

Decisions concerning inpatient hospital admission or discharge of a patient with suspected or developing SARS should generally be based on the patient's health-care needs (e.g., diagnostic, therapeutic, or supportive regimens that necessitate hospitalization).

- Patients should not be hospitalized solely for the purpose of infection control unless they cannot be discharged directly to their home (e.g. travelers, homeless persons) or if infection precautions recommended for the residential setting are not feasible in their home environment (e.g. crowded dormitory setting, prisons, jails, detention centers, homeless shelters, or other multi-person single room dwellings).
- Under such circumstances patients should be hospitalized using recommended infection control precautions. Patients may then be discharged as soon as arrangements can be made for discharge directly to a home or residential setting where appropriate infection control precautions can be implemented and maintained.
- Alternatively, the patient could be discharged to a designated residential facility for isolation of convalescing cases where recommended infection control measures can be followed.
- During transport between health-care facility and home or residential setting, patients should wear a surgical mask and limit interactions with others (e.g., avoid public transportation). For emergency medical ground



- transport of SARS patients, use the minimum number of EMS personnel and do not have non-SARS patients or passengers in the vehicle.
- Receiving facilities must be notified prior to arrival of suspected SARS patients to facilitate preparation of appropriate infection control procedures and facilities.
  - Concerns regarding movement of possible SARS patients in the United States should be discussed with appropriate local, state and federal health authorities, including the Centers for Disease Control and Prevention (CDC) (24 hour response number: (770) 488-7100).

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### **INFECTION CONTROL:**

#### **Inpatient setting: (3/18/03)**

If a suspect SARS patient is admitted to the hospital, infection control personnel should be notified immediately. Infection control measures for inpatients ([www.cdc.gov/ncidod/hip/isolat/isolat.htm](http://www.cdc.gov/ncidod/hip/isolat/isolat.htm)) should include:

- Standard precautions (e.g., hand hygiene); in addition to routine standard precautions, health-care personnel should wear eye protection for all patient contact.
- Contact precautions (e.g., use of gown and gloves for contact with the patient or their environment)
- Airborne precautions (e.g., an isolation room with negative pressure relative to the surrounding area and use of an N-95 filtering disposable respirator for persons entering the room)

If airborne precautions cannot be fully implemented, patients should be placed in a private room, and all persons entering the room should wear N-95 respirators. Where possible, a qualitative fit test should be conducted for N-95 respirators; detailed information on fit testing can be accessed at <http://www.osha.gov/SLTC/etools/respiratory/oshafiles/fittesting1.html>. If N-95 respirators are not available for health-care personnel, then surgical masks should be worn. Regardless of the availability of facilities for airborne precautions, standard and contact precautions should be implemented for all suspected SARS patients.

#### **Outpatient setting (03/18/03):**

If possible, suspect SARS patients, on arrival to the outpatient or ambulatory setting, e.g., clinic or Emergency Department (ED), should be evaluated in a separate assessment area to determine if they meet the case definition for suspected SARS and require isolation. A surgical mask should be placed on the patient if possible.

All health-care personnel should wear N-95 respirators while taking care of patients with suspected SARS. Precautions should be used when evaluating or transporting patients (e.g., emergency medical technicians), or in any ambulatory

health-care setting (e.g., ED or clinic personnel). If N-95 respirators are not available, surgical masks should be worn by personnel.

**Home or residential setting (03/18/03):**

Placing a surgical mask on suspect SARS patients during contact with others at home is recommended. If the patient is unable to wear a surgical mask, it may be prudent for household members to wear surgical masks when in close contact with the patient. Household members in contact with the patient should be reminded of the need for careful hand hygiene including hand washing with soap and water; if hands are not visibly soiled, alcohol-based handrubs may be used as an alternative to hand washing.

**First responders (04/11/03) :**

**General precautions:**

- In addition to respiratory droplet and possible airborne spread, SARS may be transmitted if residual infectious particles on environmental surfaces are brought into direct contact with the eyes, nose or mouth, e.g., by unwashed hands. Therefore, hand hygiene is of primary importance for all personnel working with possible SARS patients.
- Protective equipment should be used throughout transport of a suspected SARS patient.
- Personal activities (including: eating, drinking, application of cosmetics, and handling of contact lenses) should not be performed during patient transport.

**Protective equipment and procedures:**

- Disposable, non-sterile gloves must be worn for all patient contact.
- Gloves should be removed and discarded in biohazard bags after patient care is completed (e.g., between patients) or when soiled or damaged.
- Hands must be washed or disinfected with a waterless hand sanitizer immediately after removal of gloves.
- Disposable fluid-resistant gowns should be worn for all direct patient care.
- Gowns should be removed and discarded in biohazard bags after patient care is completed or when soiled or damaged.
- Eye-protection must be worn in the patient-care compartment and when working within 6 feet of the patient. Corrective eyeglasses alone are not appropriate protection.
- N-95 (or greater) respirators should be worn by personnel in the patient-care compartment during transport of a suspected SARS patient; personnel wearing respirators should be fit tested.
- The door/window between driver and patient compartments should be closed before a suspected SARS patient is brought onboard. N-95 (or greater) respirators should be worn by the driver if the driver's compartment is open to the patient-care compartment. Drivers that provide direct patient care (including moving patients on stretchers) should wear a disposable gown, eye-protection, and gloves as described above

during patient-care activities. Gowns and gloves are not required for personnel whose duties are strictly limited to driving.

- Vehicles that have separate driver and patient compartments and can provide separate ventilation to these areas are preferred for transport of possible SARS patients. If a vehicle without separate compartments and ventilation must be used, the outside air vents in the driver compartment should be open, and the rear exhaust ventilation fans should be turned on at the highest setting during transport of SARS patients to provide relative negative pressure in the patient care compartment.
- Oxygen delivery with non-rebreather facemasks may be used for patient oxygen support during transport.
- The patient may wear a paper surgical mask to reduce droplet production, if tolerated.
- Positive pressure ventilation should be performed using a resuscitation bag-valve mask. If available, units equipped for HEPA or equivalent filtration of expired air should be used.
- Cough-generating procedures should be avoided during pre-hospital care (e.g., nebulizer treatments).

### **Mechanically Ventilated Patients**

- EMS organizations should consult their ventilator equipment manufacturer to confirm appropriate filtration capability and the effect of filtration on positive pressure ventilation.
- Mechanical ventilators for SARS-patient transport should provide HEPA or equivalent filtration of airflow exhaust.

### **Waste disposal**

- Dry solid waste, e.g., used gloves, dressings, etc., should be collected in biohazard bags for disposal as regulated medical waste in accordance with local requirements at the destination hospital.
- Waste that is saturated with blood, body fluids, or excreta should be collected in leak-proof biohazard bags or containers for disposal as regulated medical waste in accordance with local requirements at the destination hospital.
- Sharp items such as used needles or scalpel blades should be collected in puncture resistant sharps containers for disposal as regulated medical waste in accordance with local requirements at the destination hospital.
- Suctioned fluids and secretions should be stored in sealed containers for disposal as regulated medical waste in accordance with local requirements at the destination hospital. Handling that might create splashes or aerosols during transport should be avoided.
- Suction devices should be fitted with in-line HEPA or equivalent filters in accordance with manufacturer's recommendations.

### **Cleaning and Disinfection after transporting a possible SARS patient**

- Compressed air that might re-aerosolize infectious material should not be used for cleaning the vehicle or reusable equipment.
- Non-patient-care areas of the vehicle should be cleaned and maintained according to vehicle manufacturer's recommendations.
- Personnel performing cleaning should wear non-sterile gloves, disposable gowns and eye-protection while cleaning the patient-care compartment.
- Patient-care compartments (including stretchers, railings, medical equipment, control panels, and adjacent flooring, walls and work surfaces likely to be directly contaminated during care) should be cleaned using an EPA-registered hospital disinfectant in accordance with manufacturer's recommendations.
- Spills of body fluids during transport should be cleaned by placing absorbent material over the spill and collecting the used cleaning material in a biohazard bag. The area of the spill should be cleaned using an EPA-registered hospital disinfectant. Cleaning personnel should be notified of the spill location and initial clean-up performed.
- Contaminated reusable patient care equipment should be cleaned and disinfected promptly after use and before returning to service.
- Personnel should wear non-sterile gloves, disposable gowns and face shields while cleaning reusable equipment.
- Reusable equipment should be cleaned and disinfected according to manufacturer's instructions.

### **Respiratory Protection (04/30/03)**

Health-care workers caring for patients with Severe Acute Respiratory Syndrome (SARS) are at risk for acquiring SARS. Although the infectivity of SARS is currently uncertain, transmission to health-care workers appears to have occurred after close contact with symptomatic individuals (e.g., persons with fever or respiratory symptoms), particularly before implementation of recommended infection control precautions for SARS (i.e., unprotected exposures). Personal protective equipment appropriate for standard, contact, and airborne precautions (e.g., hand hygiene, gown, gloves, and N95 respirators) in addition to eye protection, have been recommended for health-care workers to prevent transmission of SARS in health-care settings (see the [Infection Control and Exposure Management](#) page).

The transmission of SARS appears to occur predominantly by direct contact with infectious material, including dispersal of large respiratory droplets. However, it is also possible that SARS can be spread through the airborne route. Accordingly, CDC has recommended the use of N95 respirators, consistent with respiratory protection for airborne diseases, such as tuberculosis.

SARS, unlike tuberculosis, also appears to spread by direct contact with respiratory secretions, which makes touching contaminated objects a potential concern. Although reaerosolization of infectious material is unlikely under normal use conditions, infectious material deposited on a respirator may cause it to

become a vehicle for direct or indirect transmission. Therefore, additional infection control measures applicable to this specific situation are needed. This interim guidance provides information on the selection and handling of respirators for SARS and includes guidance for when respirators are either not available or in short supply.

1. A NIOSH-certified, disposable N95 respirator is sufficient for routine airborne isolation precautions. Use of a higher level of respiratory protection may be considered for certain aerosol-generating procedures (see [Infection Control Precautions for Aerosol-Generating Procedures on Patients Who Have SARS](#)).
  - a. Respirators should be used in the context of a complete respiratory protection program in accordance with OSHA regulations. This includes training and fit testing to ensure a proper seal between the respirator's sealing surface and the wearer's face. Detailed information on respirator programs, including fit test procedures can be accessed at [www.osha.gov/SLTC/etools/respiratory](http://www.osha.gov/SLTC/etools/respiratory).
  - b. Once worn in the presence of a SARS patient, the respirator should be considered potentially contaminated with infectious material, and touching the outside of the device should be avoided. Upon leaving the patient's room, the disposable respirator should be removed and discarded, followed by hand hygiene.
2. If a sufficient supply of respirators is not available, healthcare facilities may consider reuse as long as the device has not been obviously soiled or damaged (e.g., creased or torn). Data on reuse of respirators for SARS are not available. Reuse may increase the potential for contamination; however, this risk must be balanced against the need to fully provide respiratory protection for healthcare personnel.

If N95 respirators are reused for contact with SARS patients, implement a procedure for safer reuse to prevent contamination through contact with infectious droplets on the outside of the respirator.

  - a. Consider wearing a loose-fitting barrier that does not interfere with fit or seal (e.g., surgical mask, face shield) over the respirator.
  - b. Remove the barrier upon leaving the patient's room and perform hand hygiene. Surgical masks should be discarded; face shields should be cleaned and disinfected.
  - c. Remove the respirator and either hang it in a designated area or place it in a bag. (Consider labeling respirators with a user's name before use to prevent reuse by another individual.)

- d. Use care when placing a used respirator on the face to ensure proper fit for respiratory protection and to avoid contact with infectious material that may be present on the outside of the mask.
  - e. Perform hand hygiene after replacing the respirator on the face.
- 3. When elastomeric (rubber) or powered air purifying respirators (PAPRs) are used, their reusable elements should be cleaned and disinfected after use, in accordance with manufacturer's recommendations. When half- or full-facepiece elastomeric negative pressure respirators are used by more than one individual, filters should be replaced between individual users. When PAPRs are used, the filters should be replaced following manufacturer's recommendations. All used filters must be safely discarded.
- 4. Respiratory protective devices with a filter efficiency of 95% or greater (e.g., N95, N99, N100) may not be available in some settings due to supply shortages or other factors. In this situation, a surgical (procedure) mask should be worn. Surgical masks will provide barrier protection against large droplets that are considered to be the primary route of SARS transmission. However, surgical masks may not adequately protect against aerosol or airborne particles, primarily because they allow for leakage around the mask and cannot be fit tested. The mask should resist fluid penetration and fit tightly around the mouth and nose when properly applied to the face.
- 5. Hand hygiene is urged for all contact with suspect SARS patients or objects that may be contaminated with the virus that causes SARS, including hand washing with soap and water; if hands are not visibly soiled, alcohol-based hand rubs may be use as an alternative to hand washing.

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#### **CASE MANAGEMENT GUIDELINES:**

##### **Healthcare exposure (04/12/03):**

Health-care workers who have unprotected exposure to SARS should be vigilant for fever or respiratory symptoms during the 10 days following exposure; those who develop fever or respiratory symptoms should limit interactions outside the home and should not go to work, school, out-of-home child care, church, or other public areas. Symptomatic healthcare workers should use infection control precautions to minimize the potential for transmission and should seek healthcare evaluation. In advance of the evaluation healthcare providers should be informed that the healthcare worker may have been exposed to SARS. If symptoms do not progress to meet the suspect SARS case definition within 72 hours after first symptom onset, the health-care worker may be allowed after

consultation with infection control, occupational health, and/or local public health authorities to return to work.

1. For health-care workers who meet or progress to meet the case definition for suspected SARS (e.g., develop fever and respiratory symptoms), infection control precautions should be continued until 10 days after the resolution of fever, provided respiratory symptoms are absent or improving. Suspected SARS should be reported to local health authorities immediately.
2. Exclusion from duty is not recommended for an exposed health-care worker if they do not have either fever or respiratory symptoms; however, the worker should report any unprotected exposure to SARS patients to the appropriate facility point of contact (e.g., infection control or occupational health) immediately.
3. Active surveillance for fever and respiratory symptoms (e.g., daily screening) should be conducted on health-care workers with unprotected exposure, and the worker should be vigilant for onset of illness. Workers with unprotected exposure developing such symptoms should not report for duty, but should stay home and report symptoms to the appropriate facility point of contact immediately.
4. Passive surveillance (e.g., review of occupational health or other sick leave records) should be conducted among all health-care workers in a facility with a SARS patient, and all health-care facility workers should be educated concerning the symptoms of SARS.
5. Close contacts (e.g., family members) of SARS patients are at risk for infection. Close contacts with either fever or respiratory symptoms should not be allowed to enter the health-care facility as visitors and should be educated about this policy. A system for screening SARS close contacts who are visitors to the facility for fever or respiratory symptoms should be in place. Health-care facilities should educate all visitors about use of infection control precautions when visiting SARS patients and their responsibility for adherence to them.

#### **Household Exposure (04/29/03):**

1. SARS patients should limit interactions outside the home and should not go to work, school, out-of-home child care, or other public areas until 10 days after the resolution of fever, provided respiratory symptoms are absent or improving. During this time, infection control precautions should be used, as described below, to minimize the potential for transmission.
2. All members of a household with a SARS patient should carefully follow recommendations for hand hygiene (e.g., frequent hand washing or use of alcohol-based hand rubs), particularly after contact with body fluids (e.g., respiratory secretions, urine, or feces).
3. Use of disposable gloves should be considered for any direct contact with body fluids of a SARS patient. **However, gloves are not intended to**

- replace proper hand hygiene.*** Immediately after activities involving contact with body fluids, gloves should be removed and discarded and hands should be cleaned. Gloves must never be washed or reused.
4. Each patient with SARS should be advised to cover his or her mouth and nose with a facial tissue when coughing or sneezing. If possible, a SARS patient should wear a surgical mask during close contact with uninfected persons to prevent spread of infectious droplets. When a SARS patient is unable to wear a surgical mask, household members should wear surgical masks when in close contact with the patient.
  5. Sharing of eating utensils, towels, and bedding between SARS patients and others should be avoided, although such items can be used by others after routine cleaning (e.g., washing with soap and hot water). Environmental surfaces soiled by body fluids should be cleaned with a household disinfectant according to manufacturer's instructions; gloves should be worn during this activity.
  6. Household waste soiled with body fluids of SARS patients, including facial tissues and surgical masks, may be discarded as normal waste.
  7. Household members and other close contacts of SARS patients should be actively monitored by the local health department for illness.
  8. Household members or other close contacts of SARS patients should be vigilant for the development of fever or respiratory symptoms and, if these develop, should seek healthcare evaluation. **In advance of evaluation, healthcare providers should be informed that the individual is a close contact of a SARS patient, so arrangements can be made, as necessary, to prevent transmission to others in the healthcare setting.** Household members or other close contacts with symptoms of SARS should follow the same precautions recommended for SARS patients.
  9. At this time, in the absence of fever or respiratory symptoms, household members or other close contacts of SARS patients need not limit their activities outside the home.

#### **School Exposure (04/12/03):**

Casual contact with a SARS patient at schools, other institutions, or public gatherings (e.g., attending the same class or public gathering) has not resulted in reported transmission in the United States. However, management of students exposed (i.e., through foreign travel or close contact) to SARS patients is a concern. The following are interim recommendations concerning management of exposed students.

1. Exposed students who develop fever or respiratory symptoms (e.g., symptomatic exposed student) during the 10 days following exposure should avoid contact with others, seek immediate medical evaluation, and practice infection control precautions recommended for SARS patients in the home or residential setting. Symptomatic exposed students should not go to school or



work, but should stay home while arranging healthcare evaluation; in advance of the evaluation, healthcare providers should be informed that the individual may be developing SARS.

2. If symptoms do not progress to meet the suspect SARS case definition within 72 hours after first symptom onset, the student may be allowed to return to school or work, and infection control precautions can be discontinued.

3. For students who go on to meet the case definition for suspected SARS (e.g., develop fever and respiratory symptoms), infection control precautions should be continued until 10 days after the resolution of fever, provided respiratory symptoms are absent or improving. Suspected SARS should be reported to local health authorities, school officials, and other healthcare providers immediately.

4. If a symptomatic exposed student lives in a residence where appropriate infection control precautions cannot be implemented and maintained (e.g., crowded dormitory setting), alternative housing arrangements should be made. If there is no such alternative, the student should be hospitalized, or housed in a designated residential facility for convalescing SARS patients, where infection control precautions can be followed.

5. Exposed students without fever or respiratory symptoms should not be excluded from school; however, these individuals should be vigilant for onset of illness, and the exposure should be reported to the appropriate points of contact (e.g., school officials and local health authorities).

6. In a school which has a symptomatic exposed student enrolled during the 10 days following exposure, education concerning the symptoms of SARS and monitoring of potentially exposed students and school personnel should be conducted in consultation with the local health department.

**Community Exposure (not Healthcare or Household) (04/18/03):**

These recommendations are based on the experience in the United States to date and may be revised as more information becomes available.

Persons who may have been exposed to SARS should be vigilant for fever or respiratory symptoms over the 10 days following exposure; those who develop fever or respiratory symptoms should limit interactions outside the home and should not go to work, school, out-of-home child care, church, or other public areas. Symptomatic persons should use infection control precautions to minimize the potential for transmission and should seek healthcare evaluation. In advance of the evaluation healthcare providers should be informed that the individual may have been exposed to SARS.

If symptoms do not progress to meet the suspect SARS case definition within 72 hours after first symptom onset, the person may be allowed to return to work, school, out-of-home child care, church or other public areas, and infection control precautions can be discontinued.

For persons who meet or progress to meet the case definition for suspected SARS (e.g., develop fever and respiratory symptoms), infection control precautions should be continued until 10 days after the resolution of fever, provided respiratory symptoms are absent or improving. Suspected SARS should be reported to local health authorities and healthcare providers immediately. In the absence of both fever and respiratory symptoms, persons who may have been exposed to SARS patients need not limit their activities outside the home and should not be excluded from work, school, out-of-home child care, church or other public areas.

In a setting (e.g. work, school, out-of-home child care, church) which has a symptomatic exposed person in attendance during the 10 days following exposure, other participants (and guardians as appropriate) should be educated concerning the symptoms of SARS, and active surveillance of exposed persons (e.g., daily screening) for illness should be conducted by the local health department.

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